SMARC

MSC SM2S-IMX91

NXP® i.MX 91 Arm® Cortex®-A55 / M33

82 x 50 mm

2-3 W

-40 +85

SMARC module

NXP
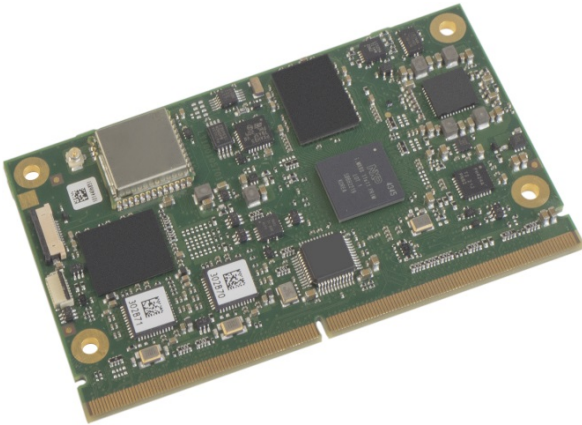
Description

The MSC SM2S-IMX91 SMARC 2.1.1 module family is highly efficient and equipped with i.MX 91 Applications Processors manufactured by NXP. The processor integrates an Arm Cortex-A55 core, bringing performance and energy efficiency to Linux-based edge applications and delivers advanced security with integrated EdgeLock secure enclave for cost-effective headless solutions at the edge.

The MSC SM2S-IMX91 provides fast and low power LPDDR4 memory technology with inline ECC support, combined with up to 256GB eMMC Flash memory. Various interfaces for embedded applications such as Dual Gigabit Ethernet, USB 2.0 and CAN-FD are available. An on-board Wireless Module is provided as assembly options. The typical design power ranges from 2 W to 3 W.

The module is compliant with the new SMARC 2.1.1 standard, allowing easy integration with SMARC baseboards. For evaluation and design-in of the SM2S-IMX91 module, Avnet Embedded provides a development platform and a starter kit. Support for Linux is available (Android support available on request).

Highlights

- Single core Arm Cortex-A55 Applications Processors up to 1.4GHz
- Media Processing Engine (MPE) with Arm Neon™ technology
- Up to 2GB LPDDR4 SDRAM with inline ECC
- Up to 256GB eMMC Flash
- 4x USB 2.0 Host interfaces
- 1x USB 2.0 Host/Device interface
- 2x Gigabit Ethernet
- Wireless Module (optional)
- 1x MMC/SD/SDIO interface
- 2x CAN-FD interfaces
- 1x I2S Audio interfaces
- 14x GPIO
- UART, SPI, I2C
- SMARC 2.1.1 Compliant

- Energy Flex Architecture
- Optimized design for low power applications

Technical Data - MSC SM2S-IMX91

Technology	Arm
Formfactor	SMARC Short Size
CPU	NXP i.MX 91 Arm Cortex-A55 Applications Processors, single-core, up to 1.4GHz, consumer and industrial grade
Chipset	SOC
RAM	Up to 2GB 2400MT/s LPDDR4 SDRAM, soldered, inline ECC support
Flash	Up to 256GB eMMC Flash
Storage Interfaces	1x MMC/SD/SDIO
USB	1x USB 2.0 Host/Client, 4x USB 2.0 Host or 1x USB 2.0 Host/Client, 1x USB 2.0 Host (optional)
Serial Interfaces	2x UART with 2-wire hand shake 2x UART w/o hand shake
Bus Interfaces	4x I2C up to 400 Kbit/s 2x CAN-FD / CAN 2.0B 2x SPI (with two chip selects)
Display Controller	not available
Display Interfaces	not available
Network Interface	2x 10/100/1000BASE-T Ethernet (one interface with TSN/1588 support) HD Wireless Module SPB209A with 802.11ac / Bluetooth 5.0, soldered (optional)
Audio Interface	1x I2S Audio
Security Device	Advanced Security, Safety, and Reliability integrated in the SOC Integrated EdgeLock secure enclave enables autonomous management of security functions, including runtime attestation, silicon root of trust, reusable certifications, trust provisioning, and fine-grain key management augmented by extensive crypto services for advanced attack resistance Trusted Platform Module (TPM) 2.0 (optional)
Miscellaneous	Watchdog Timer for system reset (programmable, 1s … 600s) RTC / temperature compensated (optional) 14x GPIO, configurable as input or output, interrupt capable 64kbit ID EEPROM on I2C bus Camera Interface not available
Feature Highlights	SMARC 2.1.1 compatible

AVNET EMBEDDED

Firmware	uboot
OS Support	Linux Board Support Package Android Board Support Package (on request)
Power Requirement	Power Supply +5V +/-5%, 5V Standby Power Consumption 2-3 W typ. (depending on CPU and optional features)
Environment	Temperature Range: Commercial: 0° … 70°C (operating) -20° … 85°C (storage) Extended: -25° … 85°C (operating) -40° … 85°C (storage) Industrial: -40° … 85°C (operating) -40° … 85°C (storage) Humidity: 5 … 95% (operating, non-condensing) 5 … 95% (storage, non-condensing)
Dimensions	82 x 50 mm
Certificates	UL / CE
Cooling	Heatspreader
Carrier	MSC SM2-MB-EP1 MSC SM2-MB-EP5

Order Reference - MSC SM2S-IMX91

Order Number	Description	Reference	Cat*
98815	SMARC module based on NXP i.MX 91, Single Core Cortex-A55 processor at 1.4GHz, 2GB LPDDR4, 32GB eMMC Flash, 2x GbE LAN, 4x USB2.0 Host, 1x USB2.0 Host/Device, BT/WLAN, no display, no camera; commercial temperature 0...+70°C (Engineering Sample - get in touch with your sales representative)	MSC SM2S-IMX91-SC-15N0NC1C ES1 PCBES	OR

*COM products are divided in two categories, „PV" (preferred variant) and „OR" (on request).

Accessories

Order Number	Description	Reference
	Carrier Options	
68488	SMARC 2.0 Embedded Platform with PCI Express x4 slot, GbE, SATA, USB 3.0, USB 2.0, USB 2.0 OTG, RS232, CAN, SPI, eSPI, SMBus, I2C and GPIO interface, LVDS/eDP, DisplayPort and HDMI display interface, regulated backlight supply, HD/I2S audio interface, MIPI CSI-2 camera interface, mini PCI Express card slot, SD card slot, fan connector, CMOS battery, Mini-ITX form factor (170 x 170 mm), ATX power connector and single 12V/24V power jack, commercial temperature range 0..+70°C	MSC SM2-MB-EP1-001 PCBFTX
83977	SMARC 2.x compatible embedded platform (146 x 80mm), 10-36V input voltage, 3x RS232, 2x CAN, dual RJ45 LAN with LED (1 x LAN i210) , 1x M.2 2280 Key M slot, mPCIe slot, 1x USB 3.0 Type A, 1x USB 2.0 Type A, 1x USB 2.0 internal, 1x USB 2.0 Host/Device, 2x SPI, I²C, 8 GPIO on FC, 1x HDMI, LVDS/eDP/DSI on JILI30 connector, SD Card Slot, regulated backlight supply, I2S Audio, 1W Mono, camera connector, RTC battery. Industrial temperature range -40..+85°C, Arm full version	MSC SM2S-MB-EP5-002 PCBFTX
83981	SMARC 2.x compatible embedded platform (146 x 80mm), 10-36V input voltage, 2x UART, 1x RS232, 2x CAN, 1x RJ45 LAN with LED, 1x USB 2.0 Type A, 1x USB3.0 Type A, 1x USB 2.0 internal, 1x USB 2.0 Host/Device, 2x SPI, 12 GPIO on FC, 1x HDMI , SD Card Slot, LVDS/eDP/DSI on JILI30 connector, regulated backlight supply, RTC battery. Industrial temperature range -40..+85°C, Arm slim version	MSC SM2S-MB-EP5-004 PCBFTX
	Other Accessories	
82479	Debug Console (UART) Adapter for i.MX6-based Qseven and nanoRISC modules, with 8-pin FFC cable to connect COM module to 9-pin D-Sub connector	MSC Debug Console Adapter
68948	Debug Adapter for i.MX6-based Qseven, SMARC and nanoRISC modules, with 10-pin FFC cable to connect to COM module, adapter provides headers for JTAG connection to Lauterbach and/or Goepel debuggers	MSC JTAG Adapter FFC 10-pin
	Starter Kits	
97502	SMARC 2.0 Starterkit for NXP i.MX 9 based Modules. Includes MSC SM2-MB-EP1 Baseboard, Heatspreader/Heatsink, SD Card with USB Card Reader, Power Supply and suitable cable kit. The StarterKit does not include the MSC SM2S-IMX93 or SM2S-IMX91 module. Please order your choice of module separately.	MSC SM2-SK-IMX9-EP1-KIT001 BRDFTX